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ABSTRACT

Both sides of a long standing and apparently still heated argument are reviewed and presented. Are males more variable in intelligence than females? In an attempt to answer the question the author employed data from a longitudinal growth study. Results indicated that sex differences in variability on individual subtests of the Wechsler Intelligence Scale for Children (WISC), Verbal IQ, Performance IQ and Total IQ were neither significant nor even consistent for both black and white subjects over the five year period in which they were tested. Males and females had proportionally equal numbers scoring highest on individual subtests. However, in spite of a smaller sample size, males most often achieved the lowest subtest scores. Reviewing past research and his own work, the author hypothesized that the intelligence of males is not normally distributed, but slightly skewed towards the lower levels. (Author/RC)

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SEX DIFFERENCES IN VARIABILITY ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

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Introduction

The increasing concern of women over the lack of equal job opportunity in specialties long dominated by men has focused attention on the great need for an honest evaluation of women and their capabilities. If women are the equal of their male counterparts, then the lack of job opportunity is nothing more than unfair sex descrimination. On the other hand, if women lack the mental ability to compete for many jobs, then their exclusion is justified.

Most test constructors have eliminated items with a sex bias (Wechsler, 1958). Therefore, the question of equivalent average intelligence between the sexes has rarely been challenged. Rather, the possible sex differences are in the direction of a greater male variability. Thorndike (1906) clarified this position:

> Although the male and female types are closely alike in intellectual capacities, there is an important difference in the deviations from the type in the two cases, namely, that the males deviate more. The highest males in any quality are more gifted than any of the women, and the lowest males inferior to all women (p. 2).

Havelock Ellis (1903) was one of the first proponents of a greater male psychic variation and many researchers in the early part of this century concurred with him. The theory of greater male variability undoubtedly evolved from studies of eminence as well as surveys of institutions for the feebleminded. Both indicated a prevalence of men.

Hollingworth (1914) refuted the evidence provided by studies of eminence. She felt that one should consider the physical fact that women bear and rear children, which means that much of their energy is

expended in the performance and supervision of domestic tasks, a field where eminence is impossible. Anastasi (1958) believed that a lack of educational opportunity, rather than limited mental ability, was the reason for the paucity of eminent females.

Both Hollingworth and Anastasi based the greater institutionalization of males on behavioral rather than intellectual factors. Because males had greater freedom than females, they came into conflict with their environment more often. Females, performing "women's chores" around the home, were less likely to come to the attention of authorities.

The theory of greater male variability, and the controversy it evoked, faded from the journal pages in the middle part of the twentieth century. The clash between environmental and hereditary factors had reached an impasse. However, recently, Lehrke (1972) has proposed a sex-linked recessive gene for mental retardation - a theory with a biological basis - to account for the greater variability of males.

Lehrke bases his theory of sex-linkage of retardation on studies showing higher frequency of transmission of mental retardation from mother to child than from father to child - results expected of a sex-linked trait. Lehrke supplies further evidence supporting his theory of sex-linkage. In studies of families in which there is more than one retarded child, a disproportionate number of families with only male retarded children were found.

Lehrke makes it clear that the recessive sex-linked gene for mental functioning can explain both the greater incidence of genius as well as retardation in males compared to females. However, on this point,

Anastase (1972) has written, "It is well known that the search for a herediatry basis for superior intellectual deviancy has thus far proved nororiously unproductive."

In an effort to test as objectively as possible the greater male variability theory, this investigator utilized data compiled by Dr. R. T. Osborne's Longitudinal Growth Study (1963).

Method

The data were obtained by four successive administrations of the Wechsler Intelligence Scale for Children (WISC) by trained examiners. The WISC seemed, because of its breakdown into specific intellectual abilities, to be the most informative instrument by which to examine the question of sex differences in variability. The eleven subtests of the WISC employed in this investigation are Information, Comprehension, Arithmetic, Similarities, Vocabulary, Digit Span (which can be combined to form a Verbal Intelligence score), Picture Completion, Picture Arrangement, Block Design, Object Assembly and Coding (which can be combined to form a Performance Intelligence score). All eleven subtests can be combined into a Total IQ score.

Six schools were sampled from three Georgia counties representing a small rural area (population of 20,481), a medium industrial urban area (population of 45,363) and a large industrial area (population of 188,299). The subjects were randomly selected from children entering first grade in September, 1961. These children were tested during the summer before entrance into the first grade (1961), retested at the completion of both the first year of school (1962) and the third year of school (1964), and

once again at the end of the fifth grade (1966). Subjects utilized in the present investigation had been given all four administrations of the WISC and include 62 white females, 56 white males, 47 black females and 39 black males. The average age of the children when tested initially was 6 years, 2 months.

The statistical procedure consisted of a repeated measure Analysis of Variance design, with absolute deviation scores supplanting raw scores. (Thus, each cell mean is actually the mean of the absolute deviations). The procedure is a variation on the test of homogeneity of variance employed by Levene (see Glass and Stanley, 1970). The design is a 2(sex) x 4(year) matrix. Eleven (for each subtest) such matrices are employed for both black and white subjects.

The information provided by such an analysis allows one to test for significant sex differences not only over the entire five year testing period, but at each individual testing. The study of any comparative (sex-wise) systematic changes in the variability of the abilities comprising intelligence as a child progresses through the first years of school may be helpful in deciding how much, if any, sex differences do exist and how much these differences change as the child progresses through the early years of school.

Results

Sex differences in variability, even on one subtest, were neither significant nor consistent for both black and white subjects. It appears that cultural-environmental or perhaps chance factors alone, played the most significant role in influencing results.

Based on mean deviation scores, white males were more variable than white females on 24 of the 44 possible subtest comparisons at the four testings. Black males were more variable than black females on 23 of the 44 subtest comparisons. Neither result approached significance at the 5% level (chi square distribution).

The use of either the standard deviation or the co-efficient of variation as the measure of dispersion in place of the mean deviation did not alter the results in any appreciable way. All three measures of variability indicated that males were more variable on 47 of the 88 possible subtest comparisons (44 sex comparisons for both black and white subjects). This result again did not approach significance at the 5% level.

A year by year analysis of the data did not appear to indicate any trends. However, on the most recent testing, females were more variable than males on a majority of the subtests. Overall though, differences did fluctuate from year to year, and were unreliable.

In summarizing the extreme deviant scores, it was evident that the ability for outstanding work was quantitatively as well as qualitatively distributed evenly among the sexes. As a matter of fact, the 1966 and last testing revealed that females achieved the highest score individually on 12 subtests (black and white subjects combined) compared to only 7 for males.

The most outstanding phenomenom is that at every testing for both black and white subjects, males attained the lowest score individually on

more subtests than did females. Only in 1962 did both white males and white females (individually) have the low score on 4 subtests each.

Although sex differences in variability did appear on Verbal, Performance and Total IQ scores, they were often inconsistent (for both black and white subjects) and rarely approached significance. The conclusion is that there were no significant sex differences in variability in Performance, Verbal or Total IQ.

Discussion

If one accepts Lehrke's theory of a recessive sex-linked gene for mental retardation, and if one is cognizant of the fact that nothing analogous to a sex-linked gene has ever been found at the highest levels of mental functioning, it is possible to hypothesize that the intelligence of males is not normally distributed, but slightly skewed towards the lower levels.

Lehrke proposed that "the greatestsex differences would be apparent in the moderate, mild and borderline levels." The results of the current investigation support his proposal.

Although females outnumbered males at the highest levels of intellectual functioning, this can be explained by the more numerous females included in the study. Males, in spite of their smaller numbers, still predominated most often at the lowest levels. How should one explain the preponderance of very low scoring males?

This study does indicate that at the highest levels of mental ability during the five years of school in which they were tested, females were certainly the equals of their male counterparts.

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